EXPLANATION

QUATERNARY — Pleistocene and Holocene
- Terrace deposits
- Alluvium

TERTIARY — Eocene; Paleocene
- Jackson Group
- Clairborne Group: Cockfield Formation; Cook Mountain Formation; Sparta Sand; Cane River Formation; Carrizo Sand
- Eocene deposits undifferentiated — *Includes Memphis and lower Wilcox aquifers*
- Wilcox Group — *Lighter tone is lower Wilcox aquifer*
- Midway Group

CRETACEOUS — Upper Cretaceous
- Midway Group and Upper Cretaceous deposits undifferentiated
- Upper Cretaceous deposits — *Lighter tone is Nacatoch Sand*

PALEOZOIC
- Paleozoic rocks

WATER-BEARING ZONES

- Fresh water (contains less than 1,000 parts per million dissolved solids)
- Saline water (contains more than 1,000 parts per million dissolved solids)

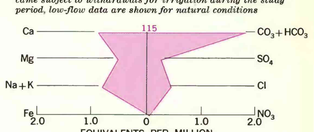
Contact

Basin boundary

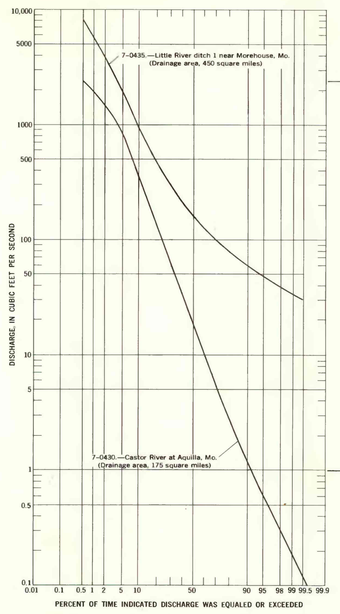
7-0400 (0.10) Daily-record station

7-0631 (0.03) Partial-record or short-term daily-record station

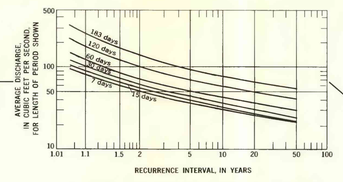
Upper number is station identification; number in parentheses is 7-day 2-year low flow, in cubic feet per second per square mile, adjusted to 1929-57. For a few of the stations that became subject to withdrawals for irrigation during the study period, low-flow data are shown for natural conditions



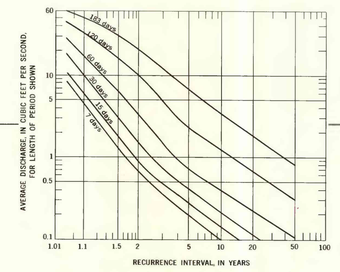
EQUIVALENTS PER MILLION
Surface-water chemical-analysis diagram
115—*Dissolved solids in parts per million*



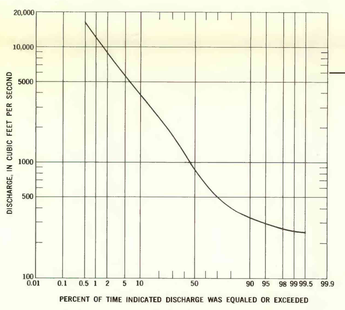
FLOW-DURATION CURVES FOR CASTOR RIVER AT AQUILLA, MO., AND LITTLE RIVER DITCH 1 NEAR MOREHOUSE, MO. 1929-57



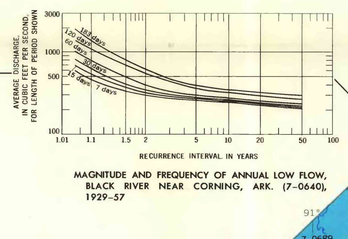
MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW, LITTLE RIVER DITCH 1 NEAR MOREHOUSE, MO. (7-0435), 1929-57



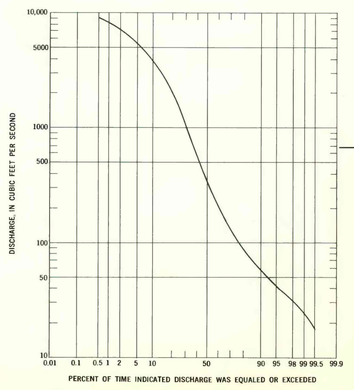
MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW, CASTOR RIVER AT AQUILLA, MO. (7-0430), 1929-57



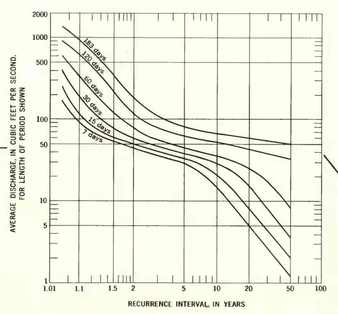
FLOW-DURATION CURVE FOR BLACK RIVER NEAR CORNING, ARK. (7-0640), 1929-57 (DRAINAGE AREA, 1,749 SQUARE MILES)



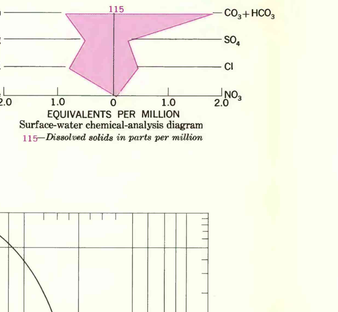
MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW, BLACK RIVER NEAR CORNING, ARK. (7-0640), 1929-57



FLOW-DURATION CURVE FOR CACHE RIVER NEAR PATTERSON, ARK. (7-0775), 1929-57 (DRAINAGE AREA, 1,041 SQUARE MILES)



MAGNITUDE AND FREQUENCY OF ANNUAL LOW FLOW, CACHE RIVER NEAR PATTERSON, ARK. (7-0775) 1929-57

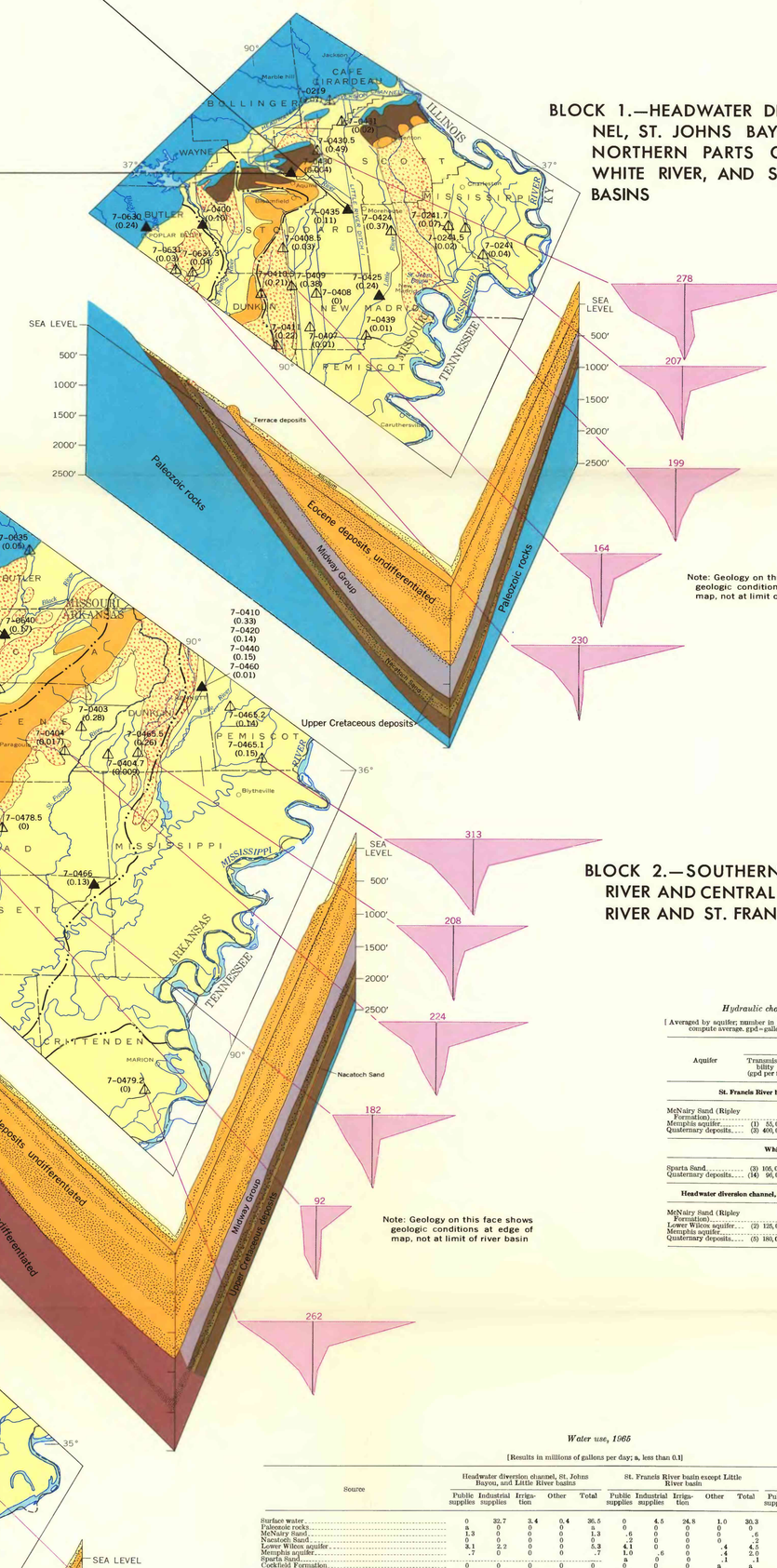


AREA COVERED BY BLOCK DIAGRAMS

Maximum, minimum, and median concentrations of selected constituents in ground water in the headwater diversion channel, St. Johns Bayou, and Little River basins

[Data in parts per million, except specific conductance, pH, color, and temperature]

Constituent	McNairy Sand (Ripley Formation)			Lower Wilcox aquifer			Memphis aquifer			Quaternary deposits		
	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
Silica (SiO_2)	26	3.5	8.9	20	4.6	11	24	3.7	10	40	1.6	17
Iron (Fe)	3.2	.00	.07	12	.13	1.4	26	.1	2.7	31	.00	4.0
Calcium (Ca)	76	1.6	26	6.4	.3	4.1	77	3.4	32	132	7.4	62
Magnesium (Mg)	30	.5	9.8	3.4	.0	1.2	19	2.4	7.5	52	.8	30
Sodium (Na)	258	5.1	138	52	3.8	38	32	2.8	16	216	3.9	13
Carbonate plus bicarbonate (CO_3+HCO_3)	684	73	315	151	10	110	311	77	148	567	28	270
Sulfate (SO_4)	102	1.0	12	13	.2	4.8	38	.6	7.8	165	.0	22
Chloride (Cl)	468	3.2	60	9.6	.0	2.4	18	2.5	6.0	172	.3	6.8
Fluoride (F)	1.2	.0	.2	.2	.0	.1	1.6	.1	.2	.8	.0	.3
Nitrate (NO_3)	84	.0	.4	1.7	.0	.8	1.8	.1	.8	96	.0	.6
Dissolved solids	980	175	492	162	49	125	401	104	178	923	113	331
Hardness as $CaCO_3$	274	10	108	32	2	16	220	22	112	465	26	240
Specific conductance (micromhos at 25°C)	1,400	283	704	250	153	185				887	217	551
pH	8.8	6.7	7.8	8.4	6.4	7.6	7.6	6.1	7.0	8.6	6.4	7.6
Color	3	0	1	25	0	11				29	1	7
Temperature (°F)	87	61	71	78	70	76				63	57	62



Hydraulic characteristics of aquifers

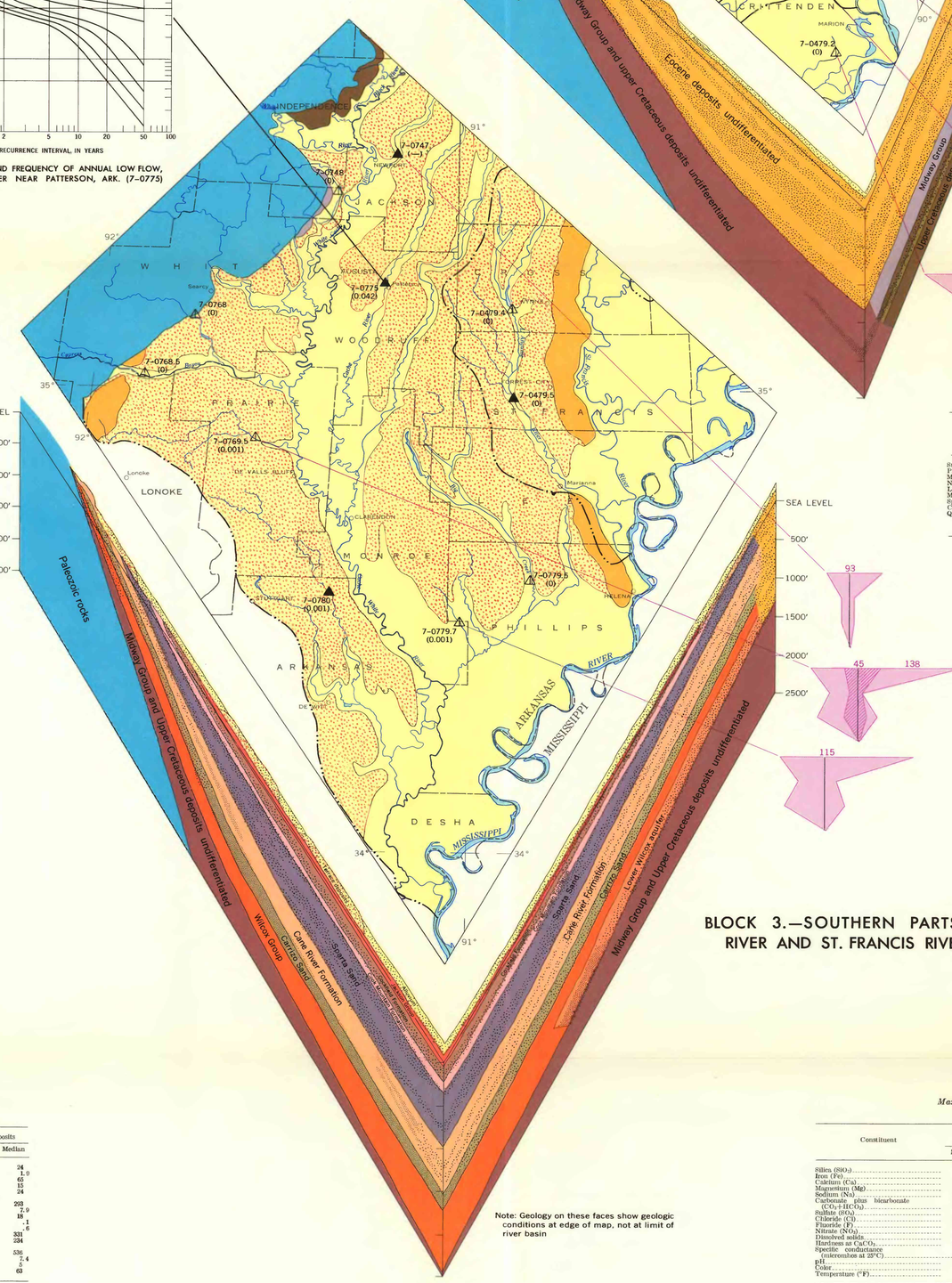
[Averaged by aquifer; number in parentheses denotes number of tests used to compute average. gpd=gallons per day; gpm=gallons per minute]

Aquifer	Coefficient: Transmissibility (gpd per ft)	Coefficient: Storage	Coefficient: Permeability (gpd per sq ft)	Specific capacity (gpm per ft of drawdown)
St. Francis River basin except Little River basin				
McNairy Sand (Ripley Formation)				(6) 5
Memphis aquifer	(1) 55,000	(1) 0.0009		
Quaternary deposits	(3) 400,000	(3) .02	(2) 3,000	(2) 63
White River basin				
Sparta Sand	(3) 105,000	(1) 0.0002		
Quaternary deposits	(14) 95,000	(4) .04	(12) 1,430	
Headwater diversion channel, St. Johns Bayou, and Little River basins				
McNairy Sand (Ripley Formation)				(7) 7
Lower Wilcox aquifer	(2) 125,000	(2) 0.0002	(2) 1,100	(6) 26
Memphis aquifer				(4) 16
Quaternary deposits	(5) 180,000	(5) .0007	(5) 1,800	(45) 66

Water use, 1965

[Results in millions of gallons per day; a, less than 0.1]

Source	Headwater diversion channel, St. Johns Bayou, and Little River basins: Public supplies	Industrial supplies	Irrigation	Other	Total	St. Francis River basin except Little River basin: Public supplies	Industrial supplies	Irrigation	Other	Total	White River basin: Public supplies	Industrial supplies	Irrigation	Other	Total
Surface water	0	32.7	3.4	0.4	36.5	0	4.5	24.8	1.0	30.3	1.5	221.0	96.8	2.9	322.2
Paleozoic rocks	a	0	0	0	a	0	0	0	0	0	0	a	0	a	a
McNairy Sand	1.3	0	0	0	1.3	.6	0	0	0	.6	a	0	0	a	a
Nacatoch Sand	0	0	0	0	0	.2	0	0	0	.2	0	0	0	0	0
Lower Wilcox aquifer	3.1	2.2	0	0	5.3	4.1	0	0	.4	4.5	1.0	0	0	.2	1.2
Memphis aquifer	.7	0	0	0	.7	1.0	.6	0	.4	2.0	2.6	.3	0	.3	3.2
Sparta Sand						a	0	0	.1	.1	4.9	2.9	14.0	.1	21.9
Cockfield Formation	0	0	0	0	0	0	0	0	a	a	0	0	0	a	a
Quaternary deposits	2.1	.6	71.2	2.5	76.4	1.5	3.3	224.2	4.4	233.4	3.5	29.3	466.8	6.6	509.2
Total	7.2	35.5	74.6	2.9	120.2	7.4	8.4	249.0	6.3	271.1	12.9	253.5	581.2	10.1	857.7



Note: The block diagrams are schematic, and depths and distances are not exact. For more detailed information about the aquifers and low flow of streams in these basins, refer to Prof. Papers 448-B, C, D, E, and G (Cushing and others, 1964; Boswell and others, 1965; Hosman and others, 1968; Boswell and others, 1968; and Speer and others, 1966). Additional water information for these basins is contained in the following publications:

Arkansas

Albin (1960, 1964)
Baker (1955)
Baker, Hewitt, and Billingsley (1948)
Bedinger and Reed (1960)
Counts (1957)
Counts Tait, Klein, and Billingsley (1955)
Engler, Thompson, and Kazmann (1945)
Hewitt, Baker, and Billingsley (1946)
Hosman (1964)
Klein, Baker, and Billingsley (1950)
Krinitsky and Wire (1964)
Omelion (1956)
Omelion and Criner (1955)
Tait, Baker, and Billingsley (1953)

Louisiana

Poole (1961)
Rollo (1960)
Snider and Forbes (1961)
Snider, Winner, and Epstein (1962)
Turcan and Meyer (1962)

Maximum, minimum, and median concentrations of selected constituents in ground water in the White River basin

[Data in parts per million, except specific conductance, pH, color, and temperature]

Constituent	Cane River Formation			Sparta Sand			Memphis aquifer			Cockfield Formation			Quaternary deposits		
	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
Silica (SiO_2)	34	8.0	16	25	1.0	13	32	19	26	20	10	14	46	5.6	24
Iron (Fe)	.18	.06	.12	2.8	.01	.40	.46	.09	.12	5.7	.03	.43	17	.00	1.0
Calcium (Ca)	5.7	3.6	3.8	79	2.0	39	25	12	15	125	8.0	24	265	4.0	65
Magnesium (Mg)	1.6	.0	1.3	22	1.6	12	13	4.0	7.7	31	3.7	5.2	76	.8	15
Sodium (Na)	616	297	304	367	28	45	17	7.6	12	169	58	154	901	2.3	24
Carbonate plus bicarbonate (CO_3+HCO_3)	610	280	432	550	190	348	152	62	89	542	350	382	631	8	293
Sulfate (SO_4)	11	.0	1.1	17	.0	3.6	26	.0	0.3	44	.0	2.0	240	.0	7.9
Chloride (Cl)	618	200	304	440	5.5	34	14	4.5	11	82	24	66	1,870	1.9	18
Fluoride (F)	1.0	.1	.4	.6	.0	.1	.3	.0	.0	.8	.0	.1	0.5	.0	.1
Nitrate (NO_3)	3.0	.2	.8	1.7	.1	.8	8.6	.8	1.6	2.3	.2	.5	0.5	.0	.6
Dissolved solids	1,560	766	776	1,220	213	384	154	122	143	617	398	465	3,720	37	331
Hardness as $CaCO_3$	20	9	15	288	12	135	116	46	72	440	40	78	571	15	234
Specific conductance (micromhos at 25°C)	3,520	1,320	1,300	2,040	387	686	239	165	224	1,030	657	865	6,220	64	536
pH	7.8	7.3	7.6	8.1	6.7	7.6	7.8	6.5	6.8	8.2	7.4	7.8	8.4	5.2	7.4
Color				70	5	5				5	1	4	30	0	5
Temperature (°F)	80	70	75	74	66	70	63	60	61	67	63	64	68	59	63

Maximum, minimum, and median concentrations of selected constitutents in ground water in the St. Francis River basin except Little River basin

[Data in parts per million, except specific conductance, pH, color, and temperature]

Constituent	McNairy Sand (Ripley Formation)			Lower Wilcox aquifer			Carrizo Sand			Sparta Sand			Memphis aquifer			Cockfield Formation			Quaternary deposits		
	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
Silica (SiO_2)	36	5.5	10	14	5.6	11	57	13		17	13	15	32	5.6	26	11	10		37	7.6	19
Iron (Fe)	3.2	.00	.15	1.6	.07	.34	5.9	.70		2.2	.02	.65	3.3	.09	.74	.21	.03		17	.00	3.0
Calcium (Ca)	63	2.0	14	4.6	.3	1.3	29	2.8		65	16	34	79	12	29	30	12		165	15	94
Magnesium (Mg)	34	.6	4.7	.9	.0	.3	1.6	.8		16	2.6	15	31	4.0	9.4	5.3	3.7		67	.8	29
Sodium (Na)	240	4.6	153	258	34	45	484	296		598	28	214	18	7.3	9.6	148	118		212	4.2	15
Carbonate plus bicarbonate (CO_3+HCO_3)	568	44	275	418	96	118	562	459		471	344	425	402	62	110	370	350		698	70	297
Sulfate (SO_4)	35	.6	5.7	10	.0	2.3	2.8	1.3		8.0	.0	.4	26	3.6	7.2	.0	.0		309	.0	7.4
Chloride (Cl)	362	4.0	42	170	1.0	3.0	457	202		708	.4	148	26	2.0	9.5	65	55		123	2.0	7.5
Fluoride (F)	.4	.1	.2	.5	.0	.2	.9			.8	.1	.2		.0		1	1		.6	.0	.3
Nitrate (NO_3)	268	.0	.9	1.3	.0	.3				3.3	.1	.2	8.6	.3	.9	.7	.2		89	.0	.6
Dissolved solids	832	87	474	660	105	124	1,310	822		1,620	320	600	373	110	145	434	398		1,220	120	311
Hardness as $CaCO_3$	292	8	57	15	1	4	110	10		228	53	128	324	46	91	97	58		888	41	242
Specific conductance (micromhos at 25°C)				1,160	166	196				2,080	544	1,060	616	165	230	754	687		980	199	478
pH	8.4	7.9	8.1	8.6	7.3	7.8				8.2	7.4	7.6	7.9	6.5	7.0	8.2	8.2		8.5	6.6	7.7
Color	10	1	6	60	0	6	85			12	2	5	10	0	6	2	1		30	0	7
Temperature (°F)	82	73	80	82	69	75				69	63	68	68	60	62	64	63		68	56	63

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1970—W68264

BLOCK DIAGRAMS, GRAPHS, AND CHEMICAL-ANALYSES DIAGRAMS SHOWING AVAILABILITY AND QUALITY OF WATER IN THE NORTHWESTERN PART OF THE MISSISSIPPI EMBAYMENT